at each designated spanwise location. Furthermore, the adjacent rows **272***a* to **272***b*, **272***b* to **272***c*, etc. are preferably offset from one another such that the edges **270** of the first row **272***a* overlie the wells **268** of the subsequent row **272***b*.

In operation, cooling fluid F flows along the inner wall **235** of the rotor **228** toward the bridge structures **260** in the vaporization section **238**. The cooling fluid enters the capture groove **266** of the first row **272***a* of bridge structures **260**. Cooling fluid F continues to build-up within the capture groove **266** until the level of cooling fluid F reaches the edges **270** of the groove **266** at the interface with the inner surface **235** of the rotor wall **233**. The cooling fluid F then cascades over the edges **270** of the grooves **266** under the centrifugal field as shown by arrows **274**. Because the subsequent row **272***b* of bridge structures **260** is arranged so that the wells **268** underlie the edges **270** of the first row **272***a*, the cascading fluid F is caught in the capture grooves **266** of the second row **272***b* of bridge structures **260**. Thus, the cooling fluid F flows from one row **272***a* of bridge structures **260** to the next. The bridge structures **260** within each row, moreover, are preferably arranged in sufficient proximity to one another so that cooling fluid F, splashing from the capture groove **266** or well **268** of one bridge structure **260**, if not caught within the capture grooves **266** of the subsequent row, is interrupted by an adjacent bridge structure **260**.

In addition to cascading from one row **272***a* to the next row **272***b*, a portion of cooling fluid F also evaporates from each row **272***a* of bridge structures **260**. Since the bridge structures **260** are arched inwardly, the cooling fluid F collects in that portion of the grooves **266** adjacent to the rotor wall **233**. The evaporation of cooling fluid F adjacent to the rotor wall **233** cools that portion of the rotor wall **233**. As discussed above, due to the increased vapor pressure within the vaporization section **238**, evaporated cooling fluid is pumped radially inward into the condensing section where it transitions back to a liquid and is available to start the cooling process all over again.

In addition to cooling the rotor **228**, the bridge structures **260** which extend circumferentially across the cavity **234** add structural integrity to the rotor **228** in the vaporization section **238**.

It should be understood that the bridge structures **260** may also be disposed in the condensing section **236** of the rotor to improve the condensation of evaporated cooling fluid F and to control its outward flow velocity in the same general manner as described above with reference to the sequential barriers **248** (FIG. **3**).

FIGS. **9**A and **9**B illustrate another embodiment of the invention. FIG. **9**A is a partial cross-section of a blade section **232** of a rotor **228** in a vaporization section **238**. An array of capture shelves **240** having a contoured edge **910** are formed in a wall **233** of the rotor **228**. Each shelf **240** further includes a well **241**. FIG. **9**B is an end view of the contoured edge **910** of the capture shelves **240** of FIG. **9**A. Specifically, each shelf lip **242** defines a contoured edge **910** opposite the blade wall **233**. As shown in FIG. **9**B, the contoured edge **910** preferably includes alternating higher sections **302** and lower sections **303**.

In operation, cooling fluid F fills the first capture shelf **240** as described above. The fluid F then cascades over the lip **242** of the first shelf **240** at its lowest point, i.e., lower sections **303**. Each lower section **303** thus provides an over flow path **310** for the cooling fluid F as it cascades to the subsequent shelves **240**. Each higher section **302** of the subsequent shelf **240**, moreover, is preferably located below a corresponding lower section **303** of the preceding shelf **300** as best shown in FIG. **9**B. In addition, the higher sections **302** preferably project inwardly opposite the rotor wall **233** beyond the lower sections **303** to improve the capture of cascading cooling fluid F. Consequently, the cooling fluid F, as it cascades between capture shelves **240** via overflow paths **310**, is directed by the higher sections **302** of the subsequent shelf **240** into the well **241** of that shelf **240** where it forms a stable pool.

To provide for a stable flow of cooling fluid F between adjacent capture shelves **240** over a wide range of operating conditions, the lower sections **303** of the lip **242** are preferably formed with a V-shaped cross-section. Alternatively, the lower sections **303** of a given capture shelf **240** rather than having a uniform or constant depth, may vary over two or more depths, thereby providing controlled overflow at both low and high liquid volume flow rates.

Referring again to FIG. **9**A, each shelf lip **242** further includes a shelf face **912** opposite the wall **233**. The radial or spanwise orientation of the shelf face **912**, moreover, is preferably selected so as to improve the flowrate of cooling liquid F between the capture shelves **240**. Specifically, a first face portion **912**A associated with each lower section **303** is preferably angled forwardly relative to the direction of rotation R. That is, an inboard segment **916** of the first face portion **912**A relative to the centrifugal acceleration field G is closer to the rotor wall **233** than an outboard section **918**. By providing each first face portion **912**A with a forward angle, the cooling fluid F is maintained in contact with face portion **912**A, improving the acceleration efficiency of the cooling fluid F and providing flow control over the cooling fluid F as it enters the subsequent capture shelf **240**. The orientation of the shelf faces **912** is also preferably chosen to compensate for differential coriolis accelerations on the blade walls **233**.

It should be understood that the embodiment of the invention as shown in FIGS. **9**A and **9**B may also include the barrier and baffle elements described above.

The foregoing description has been directed to specific embodiments of this invention. It will be apparent, however, that other variations and modifications may be made to the described embodiments, with the attainment of some or all of their advantages. Therefore, it is the object of the appended claims to cover all such variations and modifications as come within the true spirit and scope of the invention.

What is claimed is:

1. An evaporatively cooled rotor adapted for rotation about an axis and having an internal cavity defining an inner surface and including a vaporization section disposed radially outwardly with respect to the rotational axis from a condensing section, the rotor further comprising:

at least one capture means in the vaporization section disposed at a substantially constant radius from the rotational axis for capturing cooling fluid contained within the internal cavity and flowing radially outwardly in a centrifugal field generated during rotation of the rotor, the capture means restricting the flow of cooling fluid to distribute cooling fluid over the inner surface of the rotor in the vaporization section; and

means for decelerating fluid flow in the condensing section projecting outwardly from the inner surface of the rotor.